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PACIFIC COAST SHELLS FROM PREHISTORIC TUSAYAN PUEBLOS

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The objects considered in this article were taken from the cemeteries of three Arizonian ruins, Homolobi, Cakwabaiyaki, and Tcübkwitalobi,¹ which were in part excavated by an expedition from the Smithsonian Institution, under my charge, in the summer of 1896.

It will be necessary for me to reserve the discussion of data bearing on the antiquity and relationship of the people who inhabited these ancient houses for another article, and for the present I will simply state that Tusayan traditionists claim the objects here considered as the property of their ancestors and the ruins from which they were obtained prehistoric sites of the habitations of Hopi clans, which later, for some reason or other, deserted them and settled with others near the Tusayan mesas.

Homolobi² is situated on the right bank of the Little Colorado, about 3 miles from Winslow, north of the Atlantic and Pacific railroad. It is between 70 and 80 miles due south of Oraibi, the most western pueblo of Tusayan.

¹ In my lists I have referred to the latter as the Cheylon and Chaves Pass ruins.

² In Hopi terminology *ki* means house or pueblo; Sikyatki, "Yellow pueblo." The terminations *bi*, *pi*, *vi* are locative, with the additional element of "elevated on a mesa;" thus Awatobi, "High place of Bow people." All the true Hopi pueblos (Hano excepted, because the name is not Hopi) have names with locative ending because situated high up on mesas. The ancient pueblos on the terrace, although half-way up the mesa, were not considered high up; hence Sikyatki, but Old Walpi, is called Kiskobi. If this rule always holds, the large ruin two miles from the one I excavated, which the Hopi called Homolobi, better satisfies the linguistic argument. I have no satisfactory etymology of the word Homolobi. Perhaps the term would better be applied to several adjacent pueblos, of which there are four within a radius of six miles from Winslow.

Cakwabaiyaki, "Blue running-water house," lies on the left bank of Cheylon creek near where it empties into the Little Colorado, about 15 miles east of Winslow, and Tcübkwitcalobi, "Antelope-notch-place of," consisting of two ruined pueblos built of malpais on hills in Chaves Pass between 30 and 40 miles southwest by south of Winslow, where there is a break in the Mogollon mountains through which runs an ancient Hopi trail from the plains south of the Little Colorado to the Verde valley and Tonto basin.

The number of prehistoric mortuary shell objects increases¹ as we go south from the ruins near the inhabited Tusayan pueblos. During extensive excavations at Sikyatki and Awatobi in 1895 I found comparatively few marine shells; at Homolobi there were more, and in the ruins at Chaves Pass the relative number much greater.²

The esteem in which seashells were held by the ancient Tusayan people and their scarcity in northern settlements led to the manufacture of clay imitations, some of which have been found by me at Awatobi, Old Walpi, and Old Cuñopavi. The species imitated in all instances was the same, *Pectunculus giganteus*.

Pectunculus giganteus, Reeve.—This shell was a favorite one for ornamental purposes among prehistoric Tusayan people, and was worked into many different forms by their ancient artists. Some of the most beautiful of these were armlets for the upper arm, bracelets for the wrists, and finger rings, all of which are well represented in my collection.

The armlets were made from large shells by grinding away the middle of the valve, leaving the periphery, which was later highly polished. The region of the shell near the umbo in many specimens was cut into a heart-shaped elevation, which in one specimen was beautifully rounded. A single armlet (plate ix, figure 2) had a small turquoise set in gum in a diagonal incision on the outside. In most instances these armlets were perforated artificially near the umbo. As a rule the surface of these armlets was smooth and without ornament, but one specimen was beautifully decorated with a characteristic incised fret covering the whole outer surface. The

¹ All specimens considered in this article were found in graves.

² I am indebted to Mr Stimpson, conchologist of the Smithsonian Institution, for the identification of the shells considered in this article.

design consisted of a series of geometric lines, interlocking at extremities but not joining. This figure is one of the simple forms of a characteristic decorative motive widespread over the whole pueblo area. In its simplest expression it appears as two crescents, turned in opposite directions, with two horns adjacent. As such it is painted on the breasts of certain Katcinas, on shields, or cut in pictographs. But it is in decoration of pottery that this simple form reaches its highest modification and complication, and it is remarkable how many complex figures of geometric shapes can be reduced to this simple type. The horns of the two crescents may elongate and develop into square frets or spiral extensions, and these in turn be continued into triangular appendages, dentate or serrate margins. They may become terraced figures, their edges so closely approximated as to be separated by zigzag intervals, which in all cases are but the space left by the break. With all these modifications, no matter how complicated, the motive can be reduced to the two horns of adjacent crescents opening toward each other but not joining. This break is comparable to a peculiarity in encircling bands drawn on pueblo pottery, called the broken lines or "lines of life." Consider such a line about a vase, bowl, or jar to be broken at several points, or, as I have found in several instances, a non-continuous band with three breaks and the ends so extended as to overlap the intervals either above or below; modify the extremities thus extended into terraced figures, spirals, or frets, and we have some of the developments of this most characteristic of all motives in the geometric designs of decorated pueblo pottery. This broken line, with its modifications, is found to have been used universally by pueblo potters, ancient and modern, accolents of cliffs or caves, wherever pueblo culture can be detected. The incisions on the armlet are simply modifications of the same motive.

Bracelets made of this shell are smaller, sligher, as a rule less carefully worked, and more abundant than armlets. The majority are perforated at the umbo, but the valves are so ground down that there remains no space for the heart-shape elevation; indeed, the thickness of the shell would not admit of it. Like the armlets, they were sometimes found free in the graves, as if cast there as a votive offering, but there can be no doubt that they were bracelets, for in more than one instance I have taken

the radius and ulna from the grave with these rings upon them. In one grave at Chaves Pass I found nine of these bracelets on the left arm of a single skeleton. It may also be mentioned that I have also found the armlets on the humerus, leaving no possible doubt as to their use.

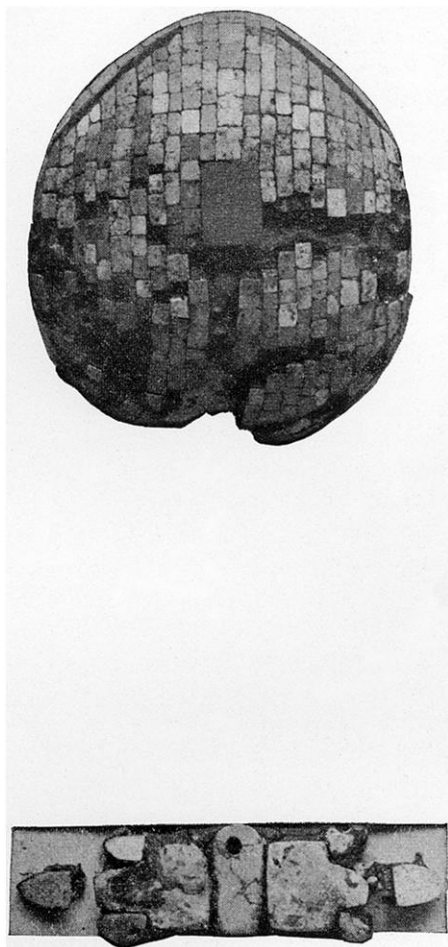
Finger rings were made of still smaller specimens of this shell by grinding them in the same way. These, as a rule, were not finely made, but were invariably perforated at the umbo, possibly on account of the thinness of the shell at that point. They seem to have been worn on all fingers, and I have taken two from the same digit.

In the manufacture of armlets, bracelets, and finger rings the middle of the shell is ground almost to its edge, but very fine examples of *Pectunculus* were found where this had not gone so far. In these specimens (plate IX, figure 5) the shell was perforated by a circular hole one-half its diameter. The use of these shells, which were commonly found in pairs, is not wholly clear to me. In some cases they were taken from near the wrists of the dead. Although as a general thing their surface was rough, due to decay, a specimen from Homolobi was found to be as smoothly polished as when in use, showing incised lines extending from the perforation to the margin.

One of the most striking forms of *Pectunculus* was of small size, the surface cut in such a way as to resemble a frog (plate IX, figure 4). The hind and fore legs were well outlined, and the head, with two beveled holes for eyes, was situated at the umbo. As if to indicate that this object was a pendant, there was a hole for suspension at the umbo. The beveled perforations suggest sockets for eyes probably made of spherical stones. Shells carved in imitation of frogs, identical with this, have been taken from the ruins in the Gila valley.

We collected from the Cheylon ruins several specimens of *Pectunculus* which were found to be smeared with a tenacious pitch-like substance. The surface of this covering showed in places rectangular depressions, and the margin of the shell had been more or less changed by grinding. Their general appearance led me to suspect that they were formerly incrustated, a suspicion which was later verified.

During the excavations at Chaves Pass we found on the breast-bone of a skeleton, several feet below the surface of the ground,



INCRUSTED SHELL AND TURQUOIS ORNAMENTS

a beautiful specimen (plate VIII) of this shell with an incrustation of turquoise mosaic set in gum or pitch. This is one of the finest specimens of aboriginal mosaic which I have ever seen. The minute pieces of turquoise of which it was made were accurately squared and perfectly fitted, their edges being beveled in such a way that the gum in which they were inlaid was invisible between them. The only stone besides turquoise used in its construction was a rectangular fragment of red jasper set in the middle of the mosaic. Retracted legs were represented by lines of smaller turquoise and were separated from the remaining mosaic by dark lines of the gum in which they were imbedded. Although no eyes were indicated, the resemblances of this work to a frog fetish is too close to overlook, especially when compared with the shell frog mentioned above.

This beautiful object was taken out of the grave in the presence of Dr Walter Hough, and was seen by me a short time after. The workman who opened the grave was Mr J. Barge-man, of Winslow, Arizona, overseer of Mexicans employed by me at the ruin. It was broken when found, but no "restoration" was made except to glue on the shell the larger fragments of mosaic, fitting them back in their former position. The anterior part was not broken, and the turquoise blocks are in the same position as when found. None had fallen out with the exception of a few near the posterior end. The fragment of red jasper in the middle of the back had become detached and was replaced. Although I have several small fragments which belong to the specimen, I have not replaced them for fear of error, and as far as human care can go the specimen is essentially the same as when found.

So far as I know, this is the only known specimen of a *Pectunculus* with turquoise incrustations resembling a frog which has been found on the drainage of the Little Colorado river. Specimens from the Gila-Salado ruins have been reported, and of these I know of but one of ancient manufacture, the specimen which was formerly in the possession of Mr Lincoln Fowler, of Phoenix, Arizona. This object I have never examined, and as no published figures of it have, to my knowledge, appeared, comparisons with it are impossible.

The art of incrusting stone mosaic by inlaying was common in ancient Tusayan pueblos, and wood, lignite, bone, and shell were

used as bases. Perhaps the best known survival of this craft in modern pueblos are the square ear pendants of wood, incrustated with turquoise, worn by women. These are seldom made at the present day, and have generally dropped out of use on the East mesa, where, however, they are preserved as heirlooms or worn in personifications of Katsinamanas. Some of the figurines on altars wear these mosaic ear ornaments, and they have not wholly passed out of use among women at the Middle mesa and Oraibi.

The center of the pendant is sometimes formed by a rectangular fragment of haliotis shell, but, as a rule, the mosaic of turquoise is clumsily made, the individual blocks not neatly fitted, and far from artistic, the workmanship in all respects inferior to that of the frog found at Chaves Pass.

The best example of prehistoric incrustation on wood which was found was taken from a grave at the Cheylon ruin. The imbedded parts of the mosaic consisted of turquoise and haliotis shell fragments, accurately fitted, making an oblong gorget (plate VIII). I have several objects made by incrusting wood with turquoise alone, but as shell forms no part in their construction I will not consider them in this article. The same limitation holds in regard to inlaying of turquoise in lignite, of which I have a beautiful ear pendant of rare workmanship. Two fragments of shell of an unknown genus, possibly allied to *Pectunculus*, were found at the Cheylon ruin. Their form (plate IX, figure 3) was that of a highly conventionalized animal, and they were probably used as ornaments, but their true character is unknown to me.

In the following table is given a brief summary of the specimens of *Pectunculus* referred to in the preceding pages:

Number of specimens.....	114
Incrusted with stone mosaic.....	1
Incrusted with pitch.....	1
Armlets, incised.....	1
Armlets, inlaid with turquoise.....	1
Armlets, not ornamented.....	10; many additional fragments.
Wristlets.....	44; many additional fragments.
Finger rings.....	30; many additional fragments.
Fragment incrusted on wood....	2
Carved in imitation of frog.....	1
Shells not worked.....	3
Shells with medial perforation.....	20

Localities.—Homolobi, Cheylon, and Chaves Pass.

Conus fergusonii, Sow.; *Conus princeps*, L.; *Conus regularis*, Sow.—Three species of *Conus* were found in prehistoric graves. These were favorite shells for the manufacture of rattles and are still used for that purpose in the modern ritual. The spire was ground away on a plane at right angles to the lip, making a conical object perforated at the apex. The larger specimens (plate ix, figure 3) were probably tied to a short crook and used as rattles with which to beat time to the sacred songs. Smaller specimens, found in great numbers on some of the skeletons, were apparently tied to garments¹ of the deceased in much the same fashion that the tin cones are appended to the kilts of Snake priests in the Snake dance.

Number of specimens.....	45
<i>C. fergusonii</i>	2
<i>C. princeps</i>	40
<i>C. regularis</i>	3

Localities.—Homolobi, Cheylon, and Chaves Pass.

Turritella tigrina, Keiner.—A single specimen of this shell was found at the Cheylon ruin. With the exception of a perforation near the lip, it was not “worked.” At the present day *Turritella* is highly esteemed, and specimens of this species are attached by a cotton string to several of the tiponis or palladia of religious societies.

Cardium elatum, Sow.—I found this shell in prehistoric Tusayan ruins for the first time in the summer of 1896. On one specimen lines in black pigment were painted about the umbo. Another specimen, found with the “incrusted *Pectunculus*” in the form of a frog, contained a number of very small obsidian arrow-points. Two specimens only were found, one each at Cheylon and Chaves Pass.

Melongena patula, Rod. et Sow.—A single specimen of this species, found at Cheylon, had the spire ground off, leaving a small orifice. This shell was probably used in ceremonials.

¹ In Hopi mythology several gods wear garments with jingling shells from the ocean. Thus the Sun (Tawa) has shells on his clothes. The monster, Teavaiya, an offspring of the Sun, carried on his back a basket hung with jingling shells, and down his legs he wore the same *mostiliti*. In certain ceremonials men still dress with a profusion of jingling shells attached to their garments. Few modern Hopi chiefs are too poor not to have at least a few seashells in their religious paraphernalia, and one can carry them no more acceptable gift than shells from the ocean. Not all shells used by the priests in the performance of their pagan rites are old. The Katsina chief, Intiwa, for the last four performances of the Niman-katsina has used in important secret rites a cyprea shell on which is graven the Lord's prayer.

Strombus galeatus, Wood.—A specimen of this shell had been treated in the same way as *Melongena*, and was probably used for the same purpose. In the presentation of the Palūlūkoñti¹ and Soyaluña, a similar shell, possibly of this species, is used to imitate the roar of the Great Plumed Serpent.

Haliotis fulgens, Phil.—This pearly shell, still highly prized by the Hopi Indians for ceremonial purposes, was equally esteemed by the prehistoric people. Three large and, when found, complete specimens were dug from the Chaves Pass ruin. Small rectangular and oval fragments, pierced for suspension, were likewise found. Fragments of the same were combined with turquois in mosaic incrustations on wood. Number of specimens, 3; numerous additional fragments; worked fragments, 5. Localities, Cheylon, and Chaves Pass.

Oliva annulata, Lam.—Several specimens of this species were found in the ruins. Some of these shells were in natural condition and others highly polished, but by far the greater number showed marks of grinding. A single specimen was truncated at one end with a perforation at the opposite extremity, evidently formerly used as species of *Conus* for rattles. Two specimens were truncated at both ends and one of these had incised lines over its surface.

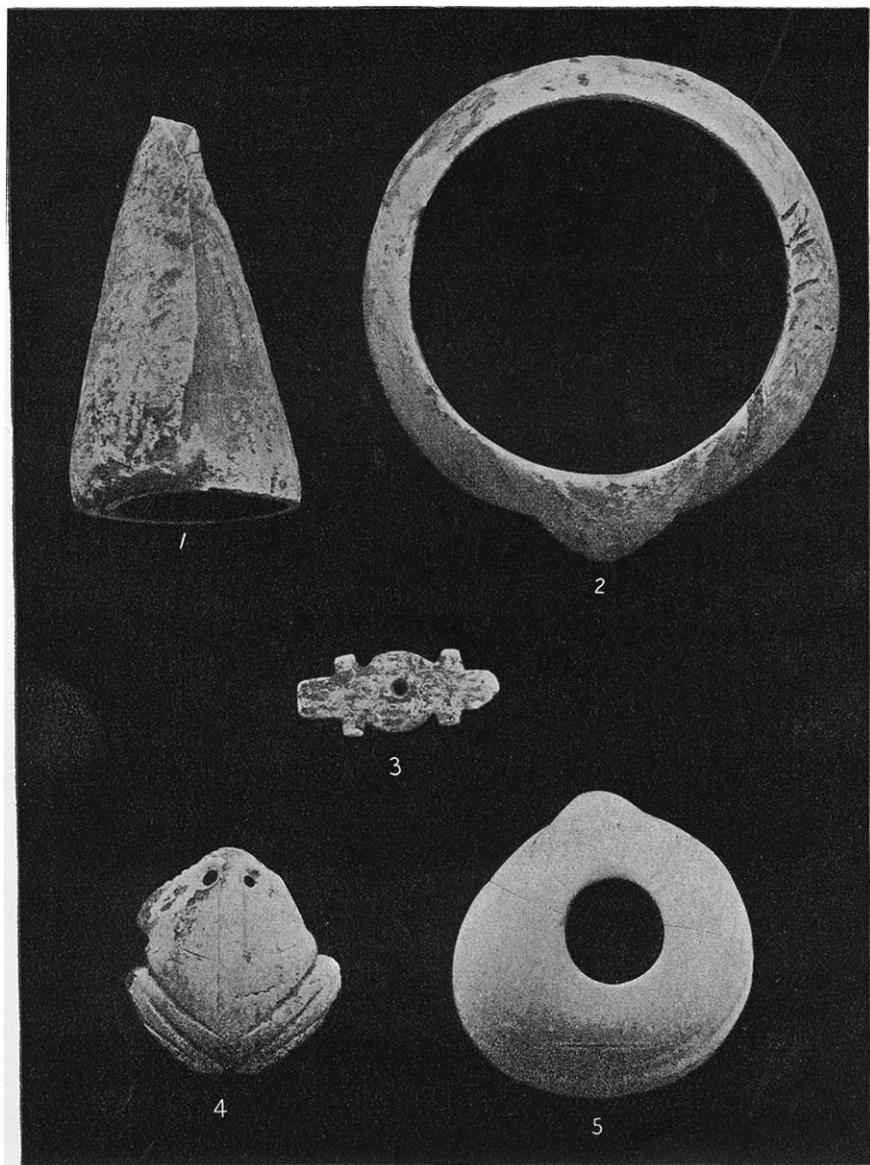
There were numerous specimens of the above species from Homolobi, Cheylon, and Chaves Pass. To these places may be added Awatobi, Sikyatki, and old Cuñopavi.

Oliva hiatula, Gmelin; *Oliva biplicata*, Sow.—These shells were the most abundant of all marine mollusca in Tusayan ruins. They were made into beads by truncating the ends, a usage which is still current in Tusayan. Ordinarily the shell was simply perforated at each end by this process, but in many specimens this truncation had gone so far that all semblance of the form of the shell was lost and a perforated disk was the result.

These worked shells were used as necklaces, for the adornment of garments and other purposes. They were found by hundreds in all ruins which I studied.

In addition to the specimens of seashells which preserved enough of their natural form to render identification possible I collected many fragments of unknown relationship. It is

¹ See my article on the Palūlūkoñti, *Journal of American Folk-Lore*.



ORNAMENTS MADE OF SEA-SHELLS

probable that the majority of these belong to some one of the species already mentioned. Of unidentified fragments perhaps the most numerous were shell beads, of which there were many hundreds. Some of these were large and of coarse make, but others so minute that it remains a marvel how they could have been manufactured with the rude implements a Stone Age people had at its control. In some instances the perforations were but a trifle larger than the diameter of a fine needle, with rim not over a sixteenth of an inch wide. The thickness of these beads was not more than that of bristol-board paper.

All the species of shells which I have found in ruins belong to the molluscan fauna of the Pacific, and are still used for ceremonial or ornamental purposes in modern Hopi pueblos. A majority of these have been found in cliff-houses and cavate dwellings; they likewise occur in even greater numbers in the ruins along the Gila and Salado in southern Arizona. I have not found a single specimen which I could trace to the Atlantic watershed, but the source of all was the Pacific ocean, or what is practically for our purposes the same, the gulf of California. Still more significant is the fact that the art upon them—the symbolism with which they are decorated—is identical with that of the ancient sedentary people of southern Arizona.

I know it may be said that the simple existence of these shells in the ruins from the Gila valley to modern Tusayan can be explained on the theory of barter, and that their distribution does not prove racial kinship of former owners is self-evident. The theory that the same symbolism and treatment of the material originated independently cannot be seriously urged in this case. While I would not say, since I have no proof one way or the other, that these shells were worked by the people who lived in the ancient ruins, I am not sure that their ancestors may not have brought them in their migrations from the south. That the culture came to Tusayan from the south appears to me probable, and that it was not only the culture, but also the ancestors of certain component clans of their people who came from that direction into Tusayan is claimed by Hopi traditionists. So far as my archeological researches bearing on this problem are concerned, they verify that claim. The remote ancestors of the Patki people of Tusayan formerly inhabited the Gila-Salado drainage area, and will later be shown to be closely allied to the Pimas, or some other tribes of that slope.

PIEGAN FORTUNE-TELLING.—The Piegan Indians have a custom, fast becoming obsolete, of inspecting the blood allowed to settle in the internal cavity of a newly killed badger from which the viscera has been removed, and from the reflection of the face as in a mirror prognosticating the death of the one who killed the animal. If the devout imagination beholds the hair reflected white, the subject will die of old age. If the visage is reflected as if bald, he will die a violent death—that is, he will be literally or figuratively *scalped*. If the face appears emaciated, with hollow eyes and cheeks, he will die of illness. Powdered charcoal or gunpowder is sometimes mixed with the blood in order that the image may better be reflected.

Certain members of the above tribe have a practice of forecasting the recovery or death of an invalid from the appearance of the hand. Sometimes they bend all the fingers backward, stretching the skin of the palm until it becomes white, like that of a dead person. If the natural hue returns immediately when the hand is released, recovery is certain, but if the cadaverous appearance lingers the contrary is assured.

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GRAPHOLOGY.—Apropos of the controversy of M. Crépieux-Jamin with M. Cesare Lombroso before the Tribunal of Commerce, in which the latter was accused of having appropriated passages from a work of the former upon graphology and adjudged to pay 2,500 francs, is a little story by Eugène Lautier in *Le Temps*. There not long ago dwelt in the Latin quarter a lemonade seller, who was also a very renowned graphologist and who between two glasses of beer was consulted by all the young academicians of the neighborhood. One day one of my literary friends, who was poor, but fond of fun, showed the *limonadier* a mysterious sentence cut from a letter. It ran as follows: "It will be truly difficult, but it can all be arranged, for the material is always on hand." The *limonadier* graphologist gravely pronounced the following judgment: "The author of this letter is a very brilliant young man, ambitious, remarkably gifted, who is thinking of his little misfortunes, but who will not fail to triumph over them to his great glory." The author of the passage was a little old tailor to whom my friend had sent a damaged overcoat for repairs.